

Applicant : Henrik Glent-Madsen  
For : METHOD FOR ESTABLISHING A LIGHT BEAM WITH  
SUBSTANTIALLY CONSTANT LUMINOUS INTENSITY  
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In the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (currently amended) Method for establishing a light beam ~~(CLB)~~ with substantially constant luminous intensity comprising the steps of
  - establishing a light beam ~~(LB)~~ by means of a light source ~~(SAL)~~ and
  - controlling an attenuation of said light beam ~~(LB)~~ on the basis of occurrences of luminous intensity peaks ~~(IP)~~ in said light beam ~~(LB)~~.
2. (currently amended) Method for establishing a light beam according to claim 1 whereby said luminous intensity peaks ~~(IP)~~ occur periodically.
3. (currently amended) Method for establishing a light beam according to claim 1 ~~or claim 2~~ whereby said luminous intensity peaks ~~(IP)~~ may at least within a particular time interval be considered of substantially equal magnitude.
4. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 3~~ claim 3 whereby said particular time interval is at least 50 hours, ~~more preferably 200 hours and even more preferably 1000 hours.~~
5. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 4~~ claim 1 whereby said controlling an attenuation comprises applying a first level of attenuation to said light beam ~~(LB)~~ at times where the luminous intensity of said light beam assumes ~~the a~~ a magnitude of an intensity floor ~~(IF)~~ and applying a further level of attenuation to the said light beam at times where luminous intensity peaks ~~(IP)~~ occur.
6. (currently amended) Method for establishing a light beam according to ~~any of the~~

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~~claims 1 to 5~~ claim 5 whereby said further level of attenuation is proportioned to the magnitude difference between said luminous intensity peaks ~~(IP)~~ and said luminous intensity floor ~~(IF)~~.

7. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 6~~ claim 1 whereby said attenuation is achieved by means of a variable attenuation means ~~(VAM)~~.

8. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 7~~ claim 7 whereby said variable attenuation means ~~(VAM)~~ is capable of applying at least two different levels of attenuation to said light beam ~~(LB)~~.

9. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 8~~ claim 8 whereby one of said at least two different levels of attenuation represents substantially no attenuation.

10. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 9~~ claim 9 whereby an attenuation control means ~~(ACM)~~ is coupled to said variable attenuation means ~~(VAM)~~.

11. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 10~~ claim 10 whereby said attenuation control means ~~(ACM)~~ controls which of said at least two different levels of attenuation that is applied to said light beam ~~(LB)~~ by means of an attenuation control signal ~~(ACS)~~.

12. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 11~~ claim 11 whereby said attenuation control means ~~(ACM)~~ is coupled to a lamp driver ~~(LD)~~ that drives said light source ~~(SAL)~~.

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13. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 12~~ claim 12 whereby said attenuation control means (~~ACM~~) controls the ~~a~~ timing of said luminous intensity peaks (~~IP~~) by means of a lamp driver control signal (~~LCS~~).

14. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 13~~ claim 12 whereby said attenuation control means (~~ACM~~) controls the ~~a~~ magnitude of said luminous intensity peaks (~~IP~~) by means of a lamp driver control signal (~~LCS~~).

15. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 14~~ claim 10 whereby said attenuation control means (~~ACM~~) receives a lamp driver reference signal (~~LRS~~) comprising information on properties of said luminous intensity peaks (~~IP~~).

16. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 15~~ claim 15 whereby said attenuation control means (~~ACM~~) controls which of said at least two different levels of attenuation that is applied to said light beam (~~LB~~) by means of said attenuation control signal (~~ACS~~) at least partly on the basis of said lamp driver reference signal (~~LRS~~).

17. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 16~~ claim 14 whereby said attenuation control means (~~ACM~~) receives an attenuation reference signal (~~ARS~~) comprising information on properties of said variable attenuation means (~~VAM~~).

18. (currently amended) Method for establishing a light beam according to ~~any of the~~

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~~claims 1 to 17~~ claim 17 whereby said attenuation control means (~~ACM~~) controls properties of said luminous intensity peaks (~~IP~~) by means of said lamp driver control signal (~~LCS~~) at least partly on the basis of said attenuation reference signal (~~ARS~~).

19. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 18~~ claim 13 whereby said attenuation control means (~~ACM~~) receives a light beam reference signal (~~BRS~~) derived from an intensity measuring device (~~BIM~~) adapted to measure the intensity of the light beam (~~LB~~).

20. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 19~~ claim 19 whereby said attenuation control means (~~ACM~~) receives a constant light beam reference signal (~~CRS~~) derived from an intensity measuring device (~~CIM~~) adapted to measure the intensity of said substantially constant intensity light beam (~~CLB~~).

21. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 20~~ claim 20 whereby said attenuation control means (~~ACM~~) controls properties of said luminous intensity peaks (~~IP~~) by means of said lamp driver control signal (~~LCS~~) at least partly on the basis of said light beam reference signal (~~BRS~~), said constant light beam reference signal (~~CRS~~) or a combination thereof.

22. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 21~~ claim 20 whereby said attenuation control means (~~ACM~~) controls which of said at least two different levels of attenuation that is applied to said light beam (~~LB~~) by means of said attenuation control signal (~~ACS~~) at least partly on the basis of said light beam reference signal (~~BRS~~), said constant light beam reference signal (~~CRS~~) or a combination thereof.

23. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 22~~ claim 12 whereby said attenuation control means (~~ACM~~) controls said variable attenuation means (~~VAM~~), said lamp driver (~~LD~~) or both at least partly on the a basis of

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predefined settings.

24. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 23~~ claim 12 whereby said attenuation control means ~~(ACM)~~ continuously controls said variable attenuation means ~~(VAM)~~, said lamp driver ~~(LD)~~, or both.

25. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 24~~ claim 10 whereby said attenuation control means ~~(ACM)~~ establishes a synchronization between ~~the~~ a timing of the application of said first and further levels of attenuation and the timing of said luminous intensity peaks ~~(IP)~~.

26. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 25~~ claim 15 whereby said variable attenuation means ~~(VAM)~~ is a ~~multilevel multi-level~~ variable variable attenuation means ~~(MVAM)~~.

27. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 26~~ claim 26 whereby said ~~multilevel multi-level~~ variable variable attenuation means ~~(MVAM)~~ is capable of applying infinite levels of attenuation to said light beam ~~(LB)~~.

28. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 27~~ claim 27 whereby said attenuation control means ~~(ACM)~~ controls which of said infinite levels of attenuation that said multilevel variable attenuation means ~~(MVAM)~~ applies to the light beam ~~(LB)~~ at least partly on the basis of ~~the~~ a magnitude difference between ~~of the~~ intensity peaks ~~(IP)~~ and the intensity floor ~~(IF)~~.

29. (currently amended) Method for establishing a light beam according to ~~any of the~~

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~~claims 1 to 28~~ claim 28 whereby said attenuation control means ~~(ACM)~~ regulates which of said infinite levels of attenuation that said multilevel variable attenuation means ~~(MVAM)~~ applies to the light beam ~~(LB)~~ at least partly on the basis of feedback from a constant light beam intensity measuring device ~~(CIM)~~.

30. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 29~~ claim 27 whereby said attenuation control means ~~(ACM)~~ controls which of said infinite levels of attenuation that said multilevel variable attenuation means ~~(MVAM)~~ applies to the light beam ~~(LB)~~ at least partly on the basis of user input.

31. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 30~~ claim 27 whereby said attenuation control means ~~(ACM)~~ controls which of said infinite levels of attenuation that said multilevel variable attenuation means ~~(MVAM)~~ applies to the light beam ~~(LB)~~ at least partly on the basis of said lamp driver reference signal ~~(LRS)~~.

32. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 31~~ claim 26 whereby said attenuation control means ~~(ACM)~~ controls which of said infinite levels of attenuation that said multilevel variable attenuation means ~~(MVAM)~~ applies to the light beam ~~(LB)~~ at least partly on the basis of ~~the an~~ an elapsed time of light source usage.

33. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 32~~ claim 10 whereby said attenuation control means ~~(ACM)~~ promotes compensation for light beam property changes caused by prolonged use of said light source ~~(SAL)~~.

34. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 33~~ claim 33 whereby said light beam property changes comprises intensity peak ~~(IP)~~ magnitude changes.

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35. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 34~~ claim 10 whereby said variable attenuation means ~~(VAM)~~ comprises a wheel ~~(W)~~ rotating around a centre of rotation ~~(COR)~~, said ~~centre~~ center of rotation being displaced from the ~~centre~~ center of a ~~cross-section~~ cross section of said light beam ~~(LB)~~ in a direction perpendicular to the direction of said light beam, at least by a distance corresponding to the radius of said ~~cross-section~~ cross section.

36. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 35~~ claim 35 whereby said wheel ~~(W)~~ comprises at least one transparent section ~~(TS)~~.

37. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 36~~ claim 35 whereby said wheel ~~(W)~~ comprises at least one cutout section ~~(CS)~~.

38. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 37~~ claim 35 whereby said wheel ~~(W)~~ comprises at least one ~~semitransparent~~ semi-transparent shaded section ~~(SS)~~.

39. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 38~~ claim 35 whereby said wheel ~~(W)~~ comprises at least one ~~semitransparent~~ semi-transparent raster section ~~(RS)~~.

40. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 39~~ claim 35 whereby said wheel ~~(W)~~ comprises at least one perforated section ~~(PS)~~.

41. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 40~~ claim 35 whereby said rotation of said wheel ~~(W)~~ is at least partly controlled by said attenuation control means ~~(ACM)~~.

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42. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 41~~ claim 35 whereby said wheel ~~(W)~~ comprises several semitransparent sections ~~(SS1, SS2, SS3)~~ each having different opacity.

43. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 42~~ claim 35 whereby said wheel ~~(W)~~ is displaceable in a direction perpendicular to the direction of said light beam ~~(LB)~~ by a user.

44. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 43~~ claim 35 whereby said wheel ~~(W)~~ is displaceable in a direction perpendicular to the direction of said light beam ~~(LB)~~ at least partly under control from said attenuation control means ~~(ACM)~~.

45. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 44~~ claim 7 whereby said variable attenuation means ~~(VAM)~~ comprises a diaphragm ~~(DP)~~ establishing an aperture ~~AP~~ of variable size.

46. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 45~~ claim 45 whereby said size of said aperture ~~AP~~ is at least partly controlled by said attenuation control means ~~(ACM)~~.

47. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 46~~ claim 7 whereby said variable attenuation means ~~(VAM)~~ comprises an opaque plate ~~(OP)~~ and mounting means ~~(AR)~~ allowing said opaque plate in a variable degree to obstruct said light beam.

48. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 47~~ claim 47 whereby said degree of obstruction is at least partly controlled by said attenuation control means ~~(ACM)~~.



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49. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 48~~ claim 10 whereby said variable attenuation means ~~(VAM)~~ comprises a displaceable sheet ~~(SH)~~, said displacement being allowed in a plane perpendicular to the direction of said light beam ~~(LB)~~.

50. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 49~~ claim 49 whereby said sheet ~~(SH)~~ comprises at least one transparent section ~~(TS)~~.

51. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 50~~ claim 49 whereby said sheet ~~(SH)~~ comprises at least one cutout section ~~(CS)~~.

52. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 51~~ claim 49 whereby said sheet ~~(SH)~~ comprises at least one ~~semitransparent~~ semi-transparent shaded section ~~(SS)~~.

53. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 52~~ claim 49 whereby said sheet ~~(SH)~~ comprises at least one ~~semitransparent~~ semi-transparent raster section ~~(RS)~~.

54. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 53~~ claim 49 whereby said sheet ~~(SH)~~ comprises at least one perforated section ~~(PS)~~.

55. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 54~~ claim 49 whereby said sheet (SH) comprises several ~~semitransparent~~ semi-transparent

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transparent sections (~~SS1, SS2, SS3~~) each having different opacity.

56. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 55~~ claim 49 whereby said displacement of said sheet (~~SH~~) is at least partly controlled by said attenuation control means (~~ACM~~).

57. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 56~~ claim 49 whereby said displacement of said sheet (~~SH~~) is at least partly controlled by a user.

58. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 57~~ claim 9 whereby said variable attenuation means (~~VAM~~) comprises at least one spatial light modulator (~~SLM~~).

59. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 58~~ claim 58 whereby said spatial light modulator (~~SLM~~) is of a magneto-optic type.

60. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 59~~ claim 58 whereby said spatial light modulator (~~SLM~~) is of an electro-optic type.

61. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 60~~ claim 58 whereby said spatial light modulator (~~SLM~~) is of an acousto-optic type.

62. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 61~~ claim 58 whereby said spatial light modulator (~~SLM~~) is a liquid crystal display.

63. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 62~~ claim 58 whereby said spatial light modulator (~~SLM~~) is a micro-mechanical shutter array.

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64. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 63~~ claim 58 whereby said spatial light modulator ~~(SLM)~~ is a DMD-modulator.

65. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 64~~ claim 58 whereby said spatial light modulator ~~(SLM)~~ is at least partly controlled by said attenuation control means ~~(ACM)~~.

66. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 65~~ claim 7 whereby said variable attenuation means ~~(VAM)~~ comprises at least one pivotally mounted mirror ~~(PM)~~ and at least one attenuation filter ~~(AF)~~.

67. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 66~~ claim 7 whereby said variable attenuation means ~~(VAM)~~ comprises means for changing ~~the a~~ a direction of said light beam ~~(LB)~~.

68. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 67~~ claim 1 whereby the luminous intensity of said established light beam with substantially constant luminous intensity ~~(CLB)~~ is completely constant.

69. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 68~~ claim 1 whereby the luminous intensity of said established light beam with substantially constant luminous intensity ~~(CLB)~~ is constant within a tolerance of  $\pm 50\%$ , ~~more preferable within a tolerance of 10%, and even more preferably within a tolerance of 1%.~~

70. (currently amended) Method for establishing a light beam according to ~~any of the~~

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~~claims 1 to 69~~claim 69 whereby the luminous energy conducted by said established light beam with substantially constant luminous intensity ~~CLB~~ during one peaking period is within  $\pm 10\%$ ; ~~more preferable within  $\pm 5\%$ , and even more preferably within  $\pm 1\%$ ,~~ of the luminous energy conducted during a nominal period.

71. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 70~~claim 1 whereby said light source ~~(SAL)~~ is a short arc lamp.

72. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 71~~claim 12 whereby said lamp driver ~~(LD)~~ establishes an alternating current with current peaks ~~(CP)~~ for driving said light source ~~(SAL)~~.

73. (currently amended) Method for establishing a light beam according to ~~any of the claims 1 to 72~~claim 12 whereby said lamp driver ~~(LD)~~ establishes a direct current with current peaks ~~(CP)~~ for driving said light source ~~(SAL)~~.

74. (currently amended) Use of the method according to ~~any of the claims 1 to 73~~claim 1 in a light modulating arrangement used for photolithography.

75. (currently amended) Use of the method according to ~~any of the claims 1 to 74~~claim 1 in a light modulating arrangement used for image projection.

76. (currently amended) An apparatus establishing a light beam ~~(CLB)~~ with substantially constant luminous intensity ~~comprising comprising:~~  
a light source ~~(SAL)~~ establishing a light beam ~~(LB)~~,  
a variable attenuation means ~~(VAM)~~, and  
an attenuation control means ~~(ACM)~~;  
wherein said light beam is moderated ~~into a light beam (CLB) with~~to have a substantially constant luminous intensity by means of the method according to ~~any of the claims 1 to~~

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| 73claim 1.